INDIANA DEPARTMENT OF TRANSPORTATION
OFFICE OF MATERIALS MANAGEMENT

REINFORCING BAR AND DOWEL BAR CERTIFICATION PROGRAM
ITM No. 301-08P

1.0 SCOPE.

1.1 The Indiana Reinforcing Bar and Dowel Bar Certification Program is a program in which the reinforcing bar and dowel bar manufacturer and the fusion bonded epoxy coater are responsible for the compliance of their product in accordance with contract requirements. The Department monitors the manufacturer's and epoxy coater's certifications by random verification sampling and testing.

1.2 The values stated in either English or acceptable SI metric units are to be regarded separately as standard, as appropriate for a specification with which this ITM is used. Within the text, SI metric units are shown in parenthesis. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other, without combining values in any way.

1.3 This ITM may involve hazardous materials, operations, and equipment and may not address all of the safety problems associated with the use of the test method. The user of the ITM is responsible for establishing appropriate safety and health practices and determining the applicability of regulatory limitations prior to use.

2.0 TERMINOLOGY.

Definitions for terms and abbreviations shall be in accordance with the Department's Standard Specifications, Section 101, and as follows:

2.1 Certified Mill Analysis**.** A document provided by the manufacturer which lists all chemical and physical test results as required by the applicable specifications. The manufacturer name and address, type and grade for reinforcing bar, diameter and grade for dowel bars, heat number, and any other data deemed necessary by the manufacturer shall be included.

2.2 Manufacturer. Reinforcing bar or dowel bar rolling mill

2.3 Coater. Fusion bonded, epoxy applicator plant

2.4 Manufacturer Classification**.** The manufacturer shall be either Certified or Non-Certified.

2.5 Coater Classification**.** The coater shall be Certified Level I, Certified Level II, or Non-Certified.

2.6 Certified Manufacturer**.** A manufacturer that has met the requirements for certification and is allowed to supply reinforcing bar and dowel bars to Department contracts.

2.7 Non-Certified Manufacturer**.** A manufacturer that does not meet certification requirements or has been removed from certification status

2.8 Certified, Level I Coater**.** An applicator plant of epoxy coating that is certified by the Concrete Reinforcing Steel Institute (CRSI)

2.9 Certified, Level II Coater**.** An applicator plant of epoxy coating that is certified by the Department

2.10 Non-Certified Coater. An applicator plant of epoxy coating that does not meet certification requirements or has been removed from certification status

3.0 SIGNIFICANCE AND USE. The Reinforcing Bar and Dowel Bar Certification Program is a program whereby the Producer takes responsibility for the production and coating of quality reinforcing and dowel bars in accordance with specification requirements and the Department monitors the Producer's quality control procedures.

4.0 CERTIFICATION PROCEDURE FOR MANUFACTURERS.

4.1 General. Certification shall be based on satisfactory compliance of heats tested to specification requirements, satisfactory comparison of test results between the manufacturer's laboratory and the Department's laboratory, and satisfactory compliance to stated conditions for random samples taken from materials arriving at the job-site. The method of certification shall consist of both laboratories testing comparable sample bars for conformance to specifications. Primary considerations are a comparison of the results obtained by both laboratories and a comparison of test data to specified product test limits. Test data from the laboratories shall compare within the limits specified.

4.2 Materials Sampling. The manufacturer shall be responsible for all plant sampling of the reinforcing and dowel bars. The specimens shall be cut and identified by the manufacturer. The samples and sample information submitted to the Department shall be as follows:

4.2.1 Sampling Frequency**.** Samples shall be obtained from three different bars from three different heats. Each sample shall be from a different bar size when available; therefore, a total of nine samples shall be obtained.

4.2.2 Sample Size**.** Samples shall be 12 ft (4 m) long. Two specimens shall be made by cutting each sample bar into two equal lengths; therefore, the specimen submitted to the Department shall be 6 ft (2 m) long. The specimen shall contain all the markings normally used by the manufacturer. Each sample of reinforcing bar shall be tagged on both ends with the same identification number and the identification number shall be unique.

4.2.3 Chemical Analysis**.** The chemical analysis for each heat represented by the test specimens shall be sent to the Department.

4.3 Materials Testing. The specification requirements and test methods shall be in accordance with the Department's Standard Specifications for qualification into the certification program. The manufacturer's laboratory tensile test equipment shall be maintained in good working order and calibrated annually by a qualified testing agency with a testing device traceable to the National Institute of Standards and Technology (NIST). A diary of all calibrations shall be maintained and shall be furnished upon request. The Department will test the companion specimens.

4.3.1 Sample Testing. One specimen from each sample shall be tested by the manufacturer and the test results entered on the Reinforcing Bar Manufacturer Certification Form (Appendix A). This form shall be submitted to the Department.

4.3.2 Laboratory Comparison Requirements**.** The test results for comparable sample specimens conducted at the manufacturer laboratory and Department laboratory shall not vary by more than the defined limits. The difference between laboratory results for unit weight, yield, and tensile tests will be divided by the Department results and shall not vary by more than the following:

Test	Difference in Test Results
Unit Weight	1 %
Yield	10 %
Tensile	10 %

The difference between laboratory results for elongation and deformation height shall not vary by more than the following:

Test	Difference in Test Results
Elongation	4 %
Deformation Height	0.2 mm

If 90 percent or more of comparable test values are within the limits for unit weight, yield, tensile, elongation, and deformation height, the manufacturer shall pass the laboratory comparison requirements.

The manufacturer will be allowed a maximum of one average test result per heat to be less than the Department Standard Specification minimum requirements as tested at either laboratory. No test specimen shall fail the bend test.

4.4 Certification. A manufacturer in compliance with the laboratory comparison and the chemical analysis requirements will receive certified manufacturer status. The manufacturer will be notified in writing as to the test results and manufacturer classification. The certified manufacturer list will be maintained by the Department.

A manufacturer not in compliance with the laboratory or chemical analysis requirements will be placed in non-certified status. The non-certified manufacturer may submit a new sample for re-evaluation with documentation indicating the quality improvements made to the manufacturing process to improve the quality of the product.

4.5 Department Responsibility. The Engineer will make a comparison between the bar identification marks, the Type B Certification provided by the bar fabricator or the manufacturer, and the invoice. All reinforcing bar and dowel bar materials shipped to Department contracts shall be accompanied by a certified mill analysis for each heat in the shipment. Under certified manufacturer status, reinforcing bars and dowel bars will be accepted based on these requirements. Periodic verification testing of random samples from the job-sites will be done.

Manufacturer plant facilities, witnessing of testing, and test records shall be accessible to the Department representative during normal working hours. The manufacturer shall be responsible for supplying material identification, certified mill analysis for all heats, and invoices to make identification of the materials sent to Department contracts.

5.0 CERTIFICATION PROCEDURE FOR COATERS.

5.1 General. Certification shall be based on satisfactory compliance of epoxy coated reinforcing bars and dowel bars with specification requirements, comparison of test results between laboratories (level II coater), and satisfactory compliance to stated conditions for random samples taken from materials arriving at the job-site. The major consideration is the comparison of test data to specified product test limits. The methods of tests and specification requirements shall be in accordance with the applicable contract documents. Certified coaters shall use reinforcing bars and dowel bars from a manufacturer on the certified manufacturers list.

5.2 Acceptance By Certified, Level I Coater. Under certified level I coater status, coated reinforcing bars and coated dowel bars will be accepted based on the coater's acceptance number issued by the Department. The coater shall be previously certified by the CRSI and in good standing at the time of acceptance. Proof of CRSI certification shall be provided to the Engineer. Certified coaters shall maintain all testing records for at least three years.

5.3 Acceptance By Certified, Level II Coater.

5.3.1 General. Under certified level II coater status, coated reinforcing bars and coated dowel bars will be accepted based on a coater's type A certification. The coater shall be previously certified by the Department based on comparison of test results between the coater's laboratory and the Department's laboratory. The coater's laboratory test equipment shall be maintained in good working order. A weekly diary of all in-house calibrations shall be maintained and shall be furnished upon request.

5.3.2 Materials Sampling. The coater shall select 10 coated reinforcing bar samples which are 12 ft (4 m) long. Each sample shall be tagged on both ends with the same identification number and each identification number shall be unique. Two specimens shall be made of each sample by cutting the bar into two equal lengths.

5.3.3 Materials Testing. One specimen from each sample shall be tested by the manufacturer and the test results entered on the provided form (Appendix B). This form shall be submitted to the Department laboratory with 10 specimens that are 6 ft (2 m) long for testing. The Department will test the companion specimens and determine if the certified level II status will be granted. At least nine of the 10 specimens shall agree with the Department test results as follows:

Epoxy Coating Thickness:	± 25 µm
Epoxy Adhesion Test:	P/F

5.3.4 Certification. A coater in compliance with the laboratory comparison requirements will receive certified coater status. The coater will be notified in writing as to the test results and coater classification. The certified coater list will be maintained by the Department.

A coater not in compliance with the testing requirements will be placed in non-certified status. The non-certified coater may submit new samples for re-evaluation with documentation indicating the changes made to the manufacturing process to improve the quality of the product.

5.4 Department Responsibility. All coated reinforcing bars and coated dowel bars shipped to Department contracts shall be accepted by a Type A certification from the coater including the coating thickness and the adhesion tests and by a Type B certification for the reinforcing and dowel bars provided by the fabricators or manufacturers for each shipment. A Type C certification from the coater shall be furnished identifying the coating material used and stating that the coating material is from the Approved List of Epoxy Coatings for Steel. The Engineer will review all certification information and test results to assure that the submittal complies with contract specifications. Periodic verification testing of random samples from the job-sites will be done.

The coater's plant facilities, witnessing of testing, and test records shall be accessible to the Department's representative during normal working hours. The coater shall provide all the documentation required for the reinforcing steel bars and dowel bars and all of the coater documentation for each shipment.

6.0 REQUIREMENTS TO MAINTAIN CERTIFICATION STATUS.

6.1 Sampling and Testing. During each year, random samples from material supplied by each certified manufacturer and each certified coater will be taken at various job-sites. The samples will include as many grades and sizes as are available at the time of sampling. The samples will be submitted to the Department laboratory for testing.

6.2 Quality Requirements. A certified manufacturer or certified coater may be placed in the non-certified status when the test results from random samples vary more than the applicable specification limits by the following frequency:

6.2.1 More than 10% of the random test samples fail the applicable specification limits

6.2.2 More than 2% of the random test samples fail the reinforcing bar bend test

6.2.3 More than 5% of the random test samples fail the epoxy adhesion test

6.3 Non-Certified Status. Failure to meet the requirements of 6.2 will place the manufacturer or coater in a non-certified status. Written notice of manufacturer or coater classification changes will be sent to both the manufacturer or coater and all Districts.

A manufacturer or coater that has been designated as non-certified may re-apply for certified status provided they demonstrate proof to the Department that the causes of the designation as non-certified have been corrected.

INDIANA DEPARTMENT OF TRANSPORTATION
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REINFORCING BAR MANUFACTURER CERTIFICATION FORM

Manufacturer Name: _____

Location: _____

Heat No.: _____ Type: _____ Grade: _____ Date: _____

PRODUCER TEST RESULTS				
Identification No.				**Average**
Designation No.				
Sample Mass, g				
Sample Length, mm				
Actual Mass, kg/m				
Yield Load, N				
Yield Strength, MPa				
Maximum Load, N				
Tensile Strength, MPa				
Elongation in 203.2 mm, %				
Bend Test, P/F				
Deformation Height, mm				

Manufacturer's Signature: _____

Testing Facility Signature: _____

Name of Testing Facility:
_____

INDIANA DEPARTMENT OF TRANSPORTATION
OFFICE OF MATERIALS MANAGEMENT
REINFORCING BAR COATER CERTIFICATION FORM

Coater Name: _____

Location: _____

Heat No.: _____ Type: _____ Grade: _____ Date: _____

*Coating Manufacturer: _____

Coating Product Name: _____

PRODUCER TEST RESULTS				
Identification No.				**Average**
Designation No.				
Coating Thickness, um				
Epoxy Bend Test, P/F				

Coater's Signature:
_____

Testing Facility Signature: _____

Name of Testing Facility:
_____

* Shall be on Department's Approved Listing of Epoxy Coating for Steel